GRAHAM DRILL SPEEDERS

The Graham Mfg. Co., Providence, R. I., has brought out a new line of drill speeders or high-speed drilling attachments, which are for use on the larger sizes of drill presses where small holes are to be made. The general advantage of these speeders is that they convert a slow-running drill press into one of high speed, thus saving the cost as well as the space required for an extra high-speed machine. A large drill works at a disadvantage in making small holes for oil, dowel pins, etc., unless some speed increasing device of this nature is

used. These attachments are intended for use on all drilling machines from the 20-inch size up to the largest radial. Few large machines are speeded sufficiently fast for drills under ⅝ inch, and radials naturally run still more slowly. The idea of trying to run machines of heavy design at the high speeds required is not good practice; the bearings are too large, the gears would make too much noise under such operating conditions, and too much vibration would be set up in the vicinity of the machine.

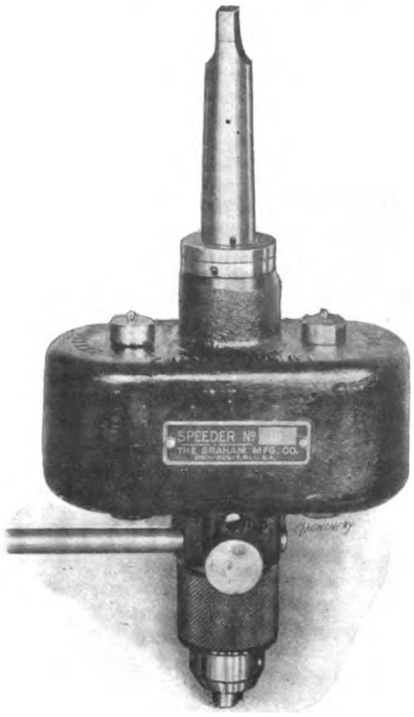

Fig. 1. Most commonly used Form of Graham Drill Speeder

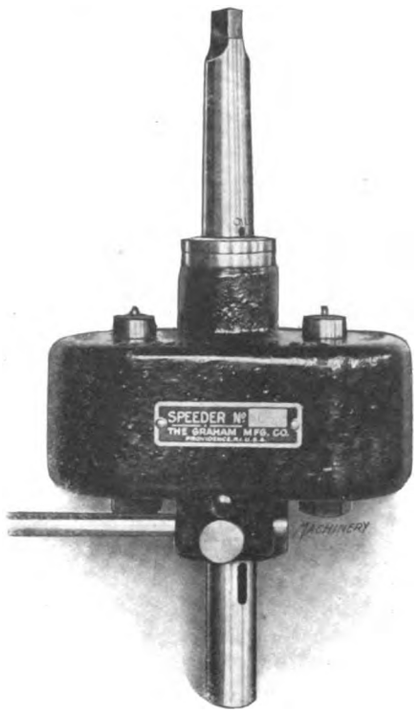

Fig. 2. Graham Drill Speeder designed for Taper Shank Drills

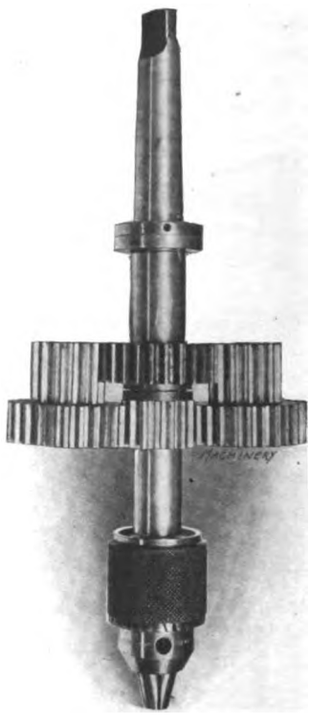

Fig. 3. Mechanism of Drill Speeder shown in Fig. 1

Referring to the illustrations, Fig. 1 shows the type of speeder most commonly used. It is made in three sizes, accommodating drills up to ¾ inch diameter. Fig. 4 shows a cross-sectional view and Fig. 3 the entire moving parts. It will be seen that the shank is of the regular taper type and has a casehardened gear fastened to it. This gear meshes with two pinions mounted on casehardened studs. A pair of gears are fastened to these pinions, which, in turn, mesh with the spindle pinion from opposite sides. The spindle and pinion are machined from a single piece of hardened tool steel. At the bottom, the spindle is fitted to a chuck, or it may be extended downward and a hole made in it to receive a taper shank drill, as shown in Fig. 2. The arrangement of the gearing balances practically all strain in the mechanism and there is no end-thrust transmitted through the case. A ball bearing is placed on a wide shoulder at the bottom of the shank, and the top of the spindle is below the ball bearing, so that there is nothing intervening but the ball bearing between the pressure applied to the shank from above and the pressure delivered to the spindle, chuck and drill below. This arrangement is clearly shown in the sectional view Fig. 4.

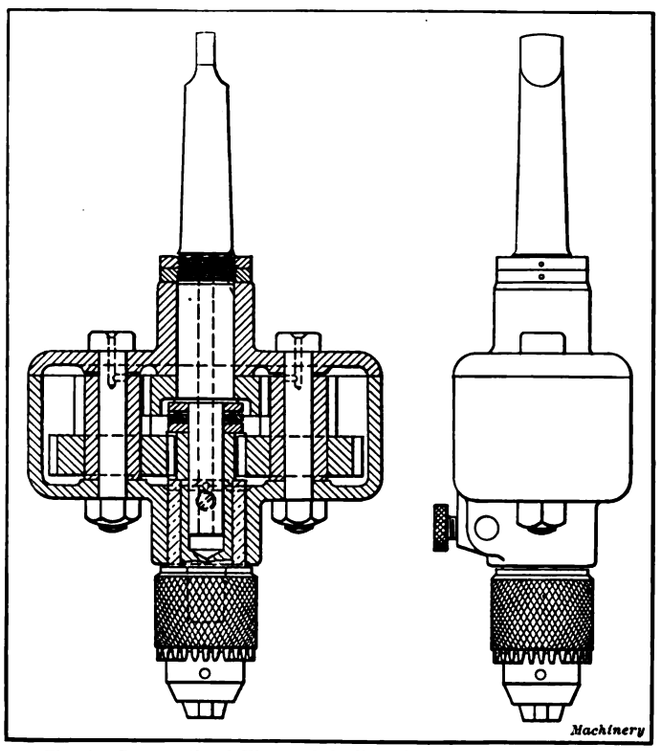

Fig. 4. Cross-sectional View and Outline of Speeder shown in Fig. 1

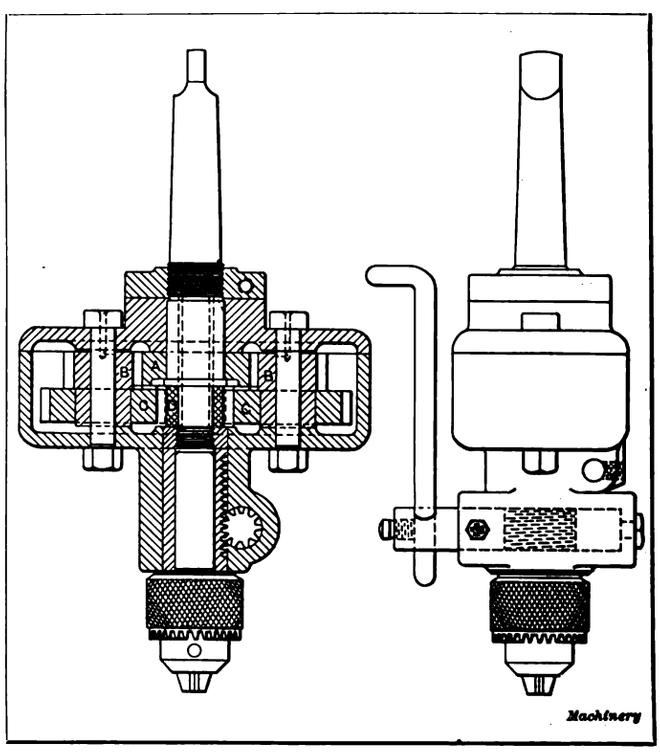

Fig. 5. Cross-sectional View and Outline of Speeder shown in Fig. 6

The matter of having perfect alignment is of great importance. This feature has been provided for by reducing the

lower end of the shank and extending it downward until it is almost even with the top of the chuck. This extension, or tail, forms a long bearing inside the spindle. Further support is given to the spindle by a bushing on the outside; this bushing is also made to take up any end wear that may develop. The two studs upon which the intermediate gear clusters are mounted also serve to hold the case together. The case must not revolve, and a bar to keep it from doing so extends to the column of the machine, or some other rigid piece of a similar nature; or the bar may be held by hand.

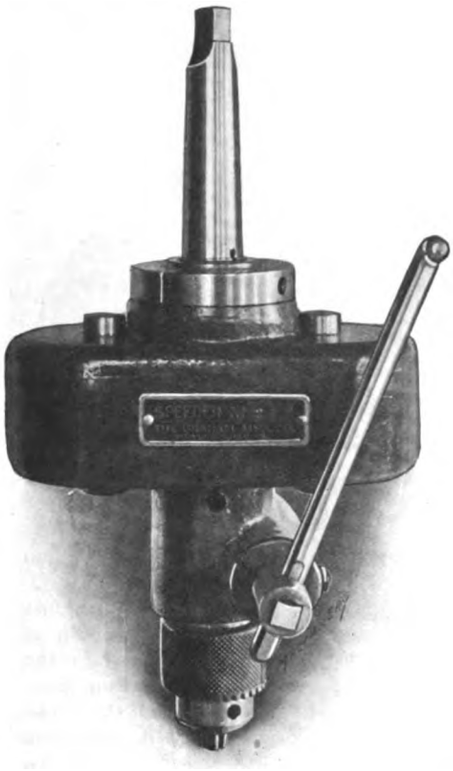

Fig. 6. Graham Drill Speeder provided with Sensitive Feed Mechanism

The device described in the foregoing is simply a speed increaser, and must be fed by the regular feed mechanism of the machine. It is made for hard service in regular manufacturing. Fig. 6 shows another type of speeder with a sensitive feed lever. This means that the main feed mechanism of the machine can be set at any desired point and locked, and that the actual feeding of the drill can be accomplished by a mechanism within the speeder. This style is not intended for heavy, constant or manufacturing service. It should be kept in the tool-room for use on all classes of fine drilling, such as making holes to lines, making templets, jig holes, lay-outs, dies, oil holes, pin holes, etc. The feed mechanism of the main machine is not usually sufficiently sensitive to the touch; hence the necessity of a spring return feed lever on the speeder itself.

In a general way, the driving mechanism is the same as that of the regular type of speeder which has been described. The speed is increased three times, and the gearing is arranged according to the previous description. The spindle is driven by a bronze gear, broached to suit splines on its upper end. It extends upward into the shank for alignment, as well as to provide the necessary length for the required end motion. In order to get vertical traverse, the spindle is mounted on a bronze racked sleeve. Into the rack there meshes a pinion, to which is fastened the return spring and the feed lever. This feature, as well as an entire section and outline is shown in Fig. 5.